Amendments to the Claims

1. (Cancelled)

2. (Currently amended) An apparatus for determining ~~a distribution of~~ particle characteristics ~~by measurement of motion of particles~~, comprising:

a) means for illuminating a plurality of particles, wherein the illuminating means produces a first light beam,

b) means for detecting light scattered from said particles, and

c) a reflector for directing light from the illuminating means, through a beam ~~splitter~~ splitting means, to the detecting means,

wherein light from the reflector is combined with light scattered from said particles to produce an interference signal.

3. (Previously presented) The apparatus of Claim 2, wherein the reflector is a partial reflector positioned within said first light beam.

4. (Currently amended) The apparatus of Claim 3, wherein said partial reflector is in a portion of said first light beam and said partial reflector has a center of curvature at a plane which is generally conjugate to a light source in said illuminating means producing said first light beam, and wherein said conjugate plane is determined by light rays in said portion of said first light beam.

5. (Currently amended) The apparatus of Claim 2, wherein said ~~partial~~ reflector is a partial reflector, which is in a converging portion of said first light beam and said partial reflector is generally flat and positioned ~~near to~~ generally at the focus of said converging portion.

6. (Currently amended) The apparatus of Claim 2, wherein said reflector is positioned within a second light beam which is reflected by said beam ~~splitter~~ splitting means and which generally does not illuminate said particles.

7. (Previously presented) The apparatus of Claim 2, wherein said first light beam is focused through a transparent wall of a container which holds the particles and wherein a focal point of said first light beam is close to said wall.

8. (Currently amended) The apparatus of Claim 2, wherein said beam ~~splitter~~ splitting means comprises a fiber optic coupler.

9. (Currently amended) The apparatus of Claim 8, wherein said reflector is on a surface of a tip of an optical fiber or in a plane which is nearly conjugate to the tip of an optical fiber, and wherein said reflector does not contact a particle dispersion.

10. (Previously presented) A plurality of systems, each as described in Claim 2, wherein said systems measure scattered light, scattered from said particles, over various ranges of scattering angles.

11. (Currently amended) The apparatus of Claim 2, wherein said first light beam passes through a long volume of fluid to ~~detect low concentration~~ determine characteristics of particles in said fluid, and wherein a flow direction of said fluid is ~~nearly~~ generally parallel to said first light beam.

12. (Currently amended) The apparatus of Claim 2, wherein the effects of intensity fluctuations of the illuminating means are removed from said interference signal by ~~subtraction of~~ calculating a difference between signals derived from amplitude variations of said illuminating means and [[from]] said interference signal.

13. (Currently amended) The apparatus of Claim 2, further comprising means for removing effects of intensity and phase fluctuations of the illuminating means from said interference signal by ~~producing~~ calculating a difference between two signals derived from two interference signals with ~~nearly~~ generally a 180 degree phase difference.

14. (Currently amended) The apparatus of Claim 13, wherein said beam ~~splitter~~ splitting means comprises at least one of a fiber optic coupler and scatter collection optics.

15. (Cancelled)

16. (Previously presented) The apparatus of Claim 13, wherein said 180 degree phase difference is maintained by a member of the group consisting of an optical phase shifter and an optical phase modulator.

17. (Currently amended) An apparatus for determining a distribution of particle characteristics by measurement of motion of particles, comprising:

a) means for illuminating a plurality of particles,

b) means for detecting light scattered from said particles, and

c) means for directing light from the illuminating means to the detecting means, wherein said directing means does not include a reflector and

wherein light from the directing means is combined with light scattered from said particles to produce an interference signal.

18. (Currently amended) The apparatus of Claim 2, including means A method for correcting a power spectrum of a signal from a scatter detector, said detecting means, to remove a portion, of said power spectrum, which is not caused by light scatter scattered from particles of interest, the method comprising:

a) directing a light beam toward a plurality of particles, and detecting light scattered from said particles,

[[b]] a) means for defining measuring a first scatter detector signal, as a function of time, with particles in a volume of dispersant which volume is viewed by a scatter detector, said detecting means,

[[c]] b) means for defining calculating a first power spectrum of said first scatter detector signal,

[[d]] c) means for defining measuring a second scatter detector signal, as a function of time, with nearly generally no particles in a volume of dispersant which volume is viewed by the scatter detector, said detecting means,

[[e]] d) means for defining calculating a second power spectrum of said second scatter detector signal,

[[f]] e) means for defining measuring a third signal, as a function of time, from a detector which monitors intensity of said light beam illuminating means, the third signal being derived while said first scatter detector signal is measured,

[[g]] f) means for defining calculating a third power spectrum from said third signal,

[[h]] g) means for defining measuring a fourth signal, as a function of time, from a detector which monitors intensity of said light beam illuminating means, the fourth signal being derived while said second scatter detector signal is measured,

[[i]] h) means for defining calculating a fourth power spectrum from said fourth signal,

(j) measuring at least one of said first power spectrum, said second power spectrum, said third power spectrum, said fourth power spectrum,

[[k]] i) means for correcting said first power spectrum using at least one item selected from the group consisting of said first power spectrum, said second power spectrum, said third power spectrum, said fourth power spectrum, mean value of said first scatter detector signal, mean value of said second scatter detector signal, mean value of said third detector signal, mean value of said fourth detector signal, and total power in at least one frequency band for at least one of the group consisting of said first scatter detector signal, said second scatter detector signal, said third detector signal, and said fourth detector signal, *using a measurement from step (j)* to calculate a power spectrum of a particle scatter signal by correcting said first power spectrum to produce a corrected power spectrum

which generally represents only a signal due to light scattered from particles of interest, wherein step (k) said correcting means does not consist of means for including only subtracting said second power spectrum from said first power spectrum, and

[[l]] j) means for calculating a distribution of particle characteristics from said corrected power spectrum.

19. (Currently amended) The apparatus of Claim 2, including means A method for correcting a power spectrum of a signal from a scattered detected/ said detecting means, to improve a dynamic range of analog to digital conversion of an interference signal derived from light which is scattered from moving particles, comprising:

a) means for using [[a]] said detector means to measure an interference signal, from at least one particle, as a function of time,

b) means for electronically filtering said interference signal to provide a filtered interference signal with a more uniform power spectrum,

c) means for converting said filtered signal from analog to digital form, to produce a digital sequence of signal values,

d) means for calculating a power spectrum of said digital sequence,

e) means for dividing said power spectrum by a power spectral transmission of said electronic filtering, at each frequency, to produce a spectral corrected power spectrum,

f) means for using said spectral corrected power spectrum to calculate characteristics of particles.

20. (New) The apparatus of Claim 2, wherein said reflector does not contact a particle dispersion.

21. (New) The apparatus of Claim 2, wherein said reflector is a retroreflector or corner cube.

22. (New) the apparatus of Claim 2, wherein the apparatus is configured as a probe, and wherein said probe is designed to be inserted into a particle dispersion.

23. (New) The apparatus of Claim 2, wherein light, which is incident on said particles, and the scattering angle, are oriented such that an effect of Doppler shift, due to particle settling, is reduced to an acceptable level.

24. (New) The apparatus of Claim 8, wherein said reflector is a partial reflector.

25. (New) The apparatus of Claim 10, wherein light in each system passes through a window with generally spherical surfaces, said surfaces having a center of curvature generally coincident with a focal point of said first light beam.

26. (New) The apparatus of Claim 10, wherein said plurality of systems are arranged inside of a probe and wherein said probe is designed to be inserted into a particle dispersion.

27. (New) The apparatus of Claim 10, wherein all detecting means receive light scattered from one illuminating means.

28. (New) The apparatus of Claim 17, wherein said directing means comprises an optical fiber and/or fiberoptic coupler.

29. (New) The apparatus of Claim 2, wherein an optical flux of light propagating towards said illumination means is reduced by a quarter wave plate.